[redacted]

THE MOST ADVANCED NAME IN DRAINAGE SYSTEMS

ADS

RE: TESTING OF (3) SAMPLES OF BUENA VISTA 300 MM (12") DIAMETER SMOOTHWALL TYPE 'S' POLYETHYLENE PIPE TO AASHTO M294M-04 FOR THE ESC PROGRAM

CONDITIONING: Not less than 40 hours at 23 ± 2° C (73° F)

TEST RESULTS:

SECTION 6.1 BASIC MATERIALS

Results:

Sample	DENSITY (g/cm3)	MELT INDEX (g/10 minutes)	CARBON
TRI Environmental	0.953	0.30	2.4
ADS	0.954	0.29	2.4

SPECIFICATION: Minimum Cell Class 335400C and SP-NCTL 15% 24hours
Density .948 to .955 g/cm3
Melt index .15 to .40 g/10 min.
Carbon Black Content 2% minimum / 5% Maximum
*Compounds that have a higher cell classification in one or more properties with the exception of density are acceptable provided product requirements are met.

CONCLUSIONS: Specification is met.

SECTION 7.1 WORKMANSHIP

SAMPLE	RESULTS
TRI Environmental	Pass
ADS	Pass

SPECIFICATION: Free of foreign inclusions and visible defects. Inner liner shall be fused to outer corrugated wall at all internal corrugation crests.

CONCLUSIONS: Specification is met.

SECTION 7.2 PIPE DIMENSIONS

SECTION 7.2.2 WALL THICKNESS

SAMPLE	Inner Wall Thickness
TRI/Environmental	0.054"
Production	0.048"

SPECIFICATION : The minimum inner wall thickness requirement is 0.9 mm 0.035"

CONCLUSIONS: Specification is met.

SECTION 7.2.3 INSIDE DIAMETER

Sample	INSIDE DIAMETER
TRI/Environmental	12.10"
ADS	12.17"

SPECIFICATION: Nominal inside diameter shall not exceed 4.5% oversize or 1.5% undersize and not more than 30mm oversize. 296 mm / 314 mm (11.65" / 12.36")

CONCLUSIONS: Specification is met.

SECTION 7.4 PIPE STIFFNESS

Sample	Orientation	Pipe Stiffness
TRI/ Environmental	0 / 45 / 90	65 / 60 / 59
ADS	0 / 45 / 90	65 / 66 / 62

SPECIFICATION: Minimum pipe stiffness requirement at 5% deflection is 345kPa (50.0PSI)

CONCLUSIONS: Specification is met.

SECTION 7.5 PIPE FLATTENING

Sample	Results
TRI/Environmental	Pass
ADS	Pass

SPECIFICATIONS: No evidence of buckling, cracking, splitting or delamination. when the vertical inside diameter is reduced by 20%.

CONCLUSIONS: Specification is met.

Section 7.6 ENVIRONMENTAL STRESS CRACKING

Sample	Results
TRI/ Environmental	Pass
ADS	Pass

SPECIFICATIONS: There shall be no cracking of the pipe.

CONCLUSIONS: Specification is met.

SECTION 7.7 BRITTLENESS

Sample	Results
TRI/Environmental	Pass
ADS	Pass

SPECIFICATION: The pipe specimens shall not crack or split.
Five non-failures out of six impacts will be acceptable.

CONCLUSIONS: Specification is met.

SECTION 7.8 FITTING REQUIREMENTS

Sample	Results
TRI/Environmental	Pass
ADS	Pass

SPECIFICATIONS: Pipe connections shall not separate to create a gap exceeding 5mm. (0.197") when measured between the bell and spigot portions of pipe fittings shall not crack or delaminate.

CONCLUSIONS: Specification is met.

SECTION 11 MARKING

Sample	MFG	SIZE	PLANT CODE	PRODUCTION DATE
TRI/Environmental	ADS	12" 300mm	B (Buena Vista)	N/A
ADS	ADS	12" 300mm	B (Buena Vista)	02/09/05

SPECIFICATION: Pipe and fitting shall be marked at intervals not more than 3.5m, manufacture's name or trademark, nominal size, AASHTO M294, plant code and date of manufacture of appropriate code.

CONCLUSIONS: Specification is met.

Terry McElfresh
Quality Control Manager

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THE MOST ADVANCED NAME IN DRAINAGE SYSTEMS

ADS

RE: TESTING OF (3) SAMPLES OF BUENA VISTA 375 MM (15") DIAMETER SMOOTHWALL TYPE 'S' POLYETHYLENE PIPE TO AASHTO M294M-04 FOR THE ESC PROGRAM

CONDITIONING: Not less than 40 hours at 23 ± 2° C (73° F)

TEST RESULTS:

SECTION 6.1 BASIC MATERIALS

Results:

Sample	DENSITY (g/cm3)	MELT INDEX (g/10 minutes)	CARBON
TRI Environmental	0.954	0.31	2.54
ADS	0.953	0.26	2.20

SPECIFICATION: Minimum Cell Class 335400C and SP-NCTL 15% 24hours
Density .948 to .955 g/cm3
Melt index .15 to .40 g/10 min.
Carbon Black Content 2% minimum / 5% Maximum
*Compounds that have a higher cell classification in one or more properties with the exception of density are acceptable provided product requirements are met.

CONCLUSIONS: Specification is met.

SECTION 7.1 WORKMANSHIP

SAMPLE	RESULTS
TRI Environmental	Pass
ADS	Pass

SPECIFICATION: Free of foreign inclusions and visible defects. Inner liner shall be fused to outer corrugated wall at all internal corrugation crests.

CONCLUSIONS: Specification is met.

SECTION 7.2 PIPE DIMENSIONS

SECTION 7.2.2 WALL THICKNESS

SAMPLE	Inner Wall Thickness
TRI/Environmental	0.062"
Production	0.056"

SPECIFICATION : The minimum inner wall thickness requirement is 1.0mm 0.039"

CONCLUSIONS: Specification is met.

SECTION 7.2.3 INSIDE DIAMETER

Sample	INSIDE DIAMETER
TRI/Environmental	15.00"
ADS	15.00"

SPECIFICATION: Nominal inside diameter shall not exceed 4.5% oversize or 1.5% undersize and not more than 30mm oversize. 369.3 mm / 391.8 mm (14.54" / 15.43")

CONCLUSIONS: Specification is met.

SECTION 7.4 PIPE STIFFNESS

Sample	Orientation	Pipe Stiffness
TRI/ Environmental	0 / 45 / 90	45 / 43 / 43
ADS	0 / 45 / 90	46 / 44 / 44

SPECIFICATION: Minimum pipe stiffness requirement at 5% deflection is 290kPa (42PSI)

CONCLUSIONS: Specification is met.

SECTION 7.5 PIPE FLATTENING

Sample	Results
TRI/Environmental	Pass
ADS	Pass

SPECIFICATIONS: No evidence of buckling, cracking, splitting or delamination. when the vertical inside diameter is reduced by 20%.

CONCLUSIONS: Specification is met.

Section 7.6 ENVIRONMENTAL STRESS CRACKING

Sample	Results
TRI/ Environmental	Pass
ADS	Pass

SPECIFICATIONS: There shall be no cracking of the pipe.

CONCLUSIONS: Specification is met.

SECTION 7.7 BRITTLENESS

Sample	Results
TRI/Environmental	Pass
ADS	Pass

SPECIFICATION: The pipe specimens shall not crack or split.
Five non-failures out of six impacts will be acceptable.

CONCLUSIONS: Specification is met.

SECTION 7.8 FITTING REQUIREMENTS

Sample	Results
TRI/Environmental	Pass
ADS	Pass

SPECIFICATIONS: Pipe connections shall not separate to create a gap exceeding 5mm. (0.197") when measured between the bell and spigot portions of pipe fittings shall not crack or delaminate.

CONCLUSIONS: Specification is met.

SECTION 11 MARKING

Sample	MFG	SIZE	PLANT CODE	PRODUCTION DATE
TRI/Environmental	ADS	15" 375mm	B (Buena Vista)	N/A
ADS	ADS	15" 375mm	B (Buena Vista)	01/27/05

SPECIFICATION: Pipe and fitting shall be marked at intervals not more than 3.5m, manufacture's name or trademark, nominal size, AASHTO M294, plant code and date of manufacture of appropriate code.

CONCLUSIONS: Specification is met.

Terry McElfresh
Quality Control Manager